

PHASE II DIOXIN SITE INVESTIGATION

FINAL REPORT

**PFISTER CHEMICAL, INC.
RIDGEFIELD, NEW JERSEY**

**NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
TRENTON, NEW JERSEY**

E.C.JORDAN CO.

DECEMBER 1985

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FOR

PFISTER CHEMICAL, INC.
RIDGEFIELD, NEW JERSEY

Submitted To

New Jersey Department of Environmental Protection
Division of Waste Management
Hazardous Site Mitigation Administration
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By

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TABLE OF CONTENTS

SECTION	TITLE	PAGE NO.
1.0	BACKGROUND	1
	1.1 Project Description	1
	1.2 Site Location	2
	1.3 Site Topography and Layout.	2
	1.4 Environmental Setting	4
	1.5 Site Use History.	4
2.0	POTENTIAL DIOXIN CONTAMINATION	6
	2.1 Use, Production or Disposal of Dioxin-Associated Chemicals.	6
	2.2 Storage and Handling Methods.	7
	2.3 Past Sampling Efforts	7
3.0	SITE RECONNAISSANCE AND RATIONALE FOR SAMPLING LOCATIONS.	7
	3.1 Summary of Site Reconnaissance.	7
	3.2 Rationale for Sampling Locations.	8
4.0	SAMPLE COLLECTION AND ANALYSIS	9
	4.1 Summary of Sampling Episode	9
	4.2 Summary of Results.	11
	4.3 Assessment of the Need for Further Dioxin Sampling.	14

REFERENCES

APPENDIX A	Site Sampling Plan
APPENDIX B	Site Specific Health and Safety Plan
APPENDIX C	Field Data Sheets
APPENDIX D	Slides of Sampling Locations

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1	RESULTS OF 2,3,7,8-TCDD ANALYSIS	12

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1	SITE LOCATION MAP	3
2	SITE PLAN	5
3	SAMPLE LOCATIONS AND ANALYTICAL RESULTS	10

PFISTER CHEMICAL, INC.
RIDGEFIELD, NEW JERSEY

1.0 BACKGROUND

1.1 Project Description

The New Jersey Department of Environmental Protection (NJDEP), in cooperation with the U.S. Environmental Protection Agency (EPA), is responsible for the identification and assessment of potential dioxin contamination in the State of New Jersey. During Phase I of the Dioxin Site Investigation Program, the NJDEP collected and analyzed soil samples from nine sites where compounds known to be associated with dioxin were produced. As part of Phase II of the program, soil and sediment samples from an additional 23 sites selected by the NJDEP were analyzed for dioxin contamination.

This report summarizes the Phase II dioxin investigation of Pfister Chemical, Inc. (Pfister) in Ridgefield, NJ conducted by E.C. Jordan under contract to the NJDEP. The investigation consisted of five major tasks: (1) file review; (2) site reconnaissance; (3) sample collection; (4) sample analysis; and (5) report preparation.

Records on file at the following offices of the NJDEP were examined during the file review:

- o Division of Waste Management, Hazardous Site Mitigation Administration, Trenton (HSMA);
- o Division of Waste Management, Bureau of Field Operations, Parsippany-Troy and Yardville (DWM);
- o Office of Science and Research, Industrial Investigation Unit, Trenton (OSR); and
- o Division of Water Resources, Trenton (DWR).

Records on file at EPA's Region II Office in Edison, NJ were also reviewed.

During the site reconnaissance, site personnel were interviewed to confirm file information. Sample locations were selected based on the site use history and observations made during the reconnaissance. The sample location selection process was designed to include those areas with the greatest potential for dioxin contamination. Because of the low mobility of dioxin in soil, most samples were collected within the surficial soil stratum (0 to 6 inches).

Samples were delivered to the Environmental Testing and Certification

Corporation (ETC) in Edison, NJ for analysis of dioxins, in particular the chlorinated dioxin isomer, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

One sample was subsequently sent to California Analytical Laboratories (Cal-Analytical) in West Sacramento, CA for re-analysis.

1.2 Site Location

Pfister Chemical, Inc.
Linden Avenue
Ridgefield, New Jersey 07657

Bergen County
Latitude 40°50'33" Longitude 74°00'34"

Ridgefield is in northeastern New Jersey, approximately 12 miles northeast of Newark. The site is just east of Exit 18E of the New Jersey Turnpike on Route 46 (Figure 1).

1.3 Site Topography and Layout

Pfister's Ridgefield facility is in a narrow low lying area on the east bank of Overpeck Creek. The site is nearly flat with an average elevation of 5 feet above mean sea level (MSL). The topography rises sharply to elevations of from 50 to 100 feet above MSL within one-quarter mile east of the site (Figure 1).

Much of the adjacent land bordering Overpeck Creek is in industrial use. The upland areas east of the site have been developed primarily for residential/commercial uses.

Figure 2 depicts the layout of the 17.5-acre Pfister site.

1.4 Environmental Setting

Overpeck Creek forms the western boundary of the Pfister site. The creek flows into the Hackensack River approximately 1.5 miles downstream of the site (Figure 1). There are extensive wetlands along the Hackensack River from this point south to Newark Bay. Non-contact cooling water is taken from and returned to Overpeck Creek. Stormwater runoff is captured by storm drains which are connected to the city sewer system. Scrubber water is also discharged to the sewer (8).

Pfister draws process water from two 300-foot deep production wells on-site and discharges it to the Bergen County Sewage Authority after neutralization (8).

There are no groundwater monitoring wells at the Pfister site (8). Consequently, Jordan was unable to obtain information on the depth to groundwater or the direction of groundwater flow during the file review. Groundwater flow is very likely influenced by the production wells on-site.

1.5 Site Use History

Pfister Chemical, Inc. built the Ridgefield plant in 1936 on the previously unoccupied site (8). Pfister manufactures chemical intermediates used by the dye and pigment industries at this location (6). Chemicals listed on Pfister's Selected Substance Report of June 1980 are: monochlorobenzene,

aniline, copper (cuprous oxide), zinc chloride, and formaldehyde. Process wastewater, cooling water, and still bottoms are the primary waste products generated (4,6).

A 2.5-acre lagoon at the Pfister site was used from around 1953 to 1980 for neutralization of process wastewater (Figure 2). This lagoon has been the subject of NJDEP and EPA investigations in recent years (5,6). Sludge samples collected from the lagoon by the NJDEP in June 1982 contained high levels of toluene, total xylenes, chlorobenzene, and ethylbenzene (5). Further analysis of the sludge was recommended by the New Jersey DWR in 1983. DWR also recommended the installation of four groundwater monitoring wells at the site in order to assess the impact of the impoundment on groundwater quality (6). As noted above, these wells have not been installed. The lagoon is unlined, but Pfister representatives have stated that it is underlain by a layer of clay 30 feet thick (4,8).

There is also a non-contact cooling water lagoon at Pfister, as depicted in Figure 2. The land on which the lagoon is constructed was reclaimed from Overpeck Creek by Pfister (8).

2.0 POTENTIAL DIOXIN CONTAMINATION

2.1 Use, Production, or Disposal of Dioxin-Associated Chemicals

Pfister produced two Class II compounds at the Ridgefield facility: 2-chloro-1,4-diethoxy-5-nitrobenzene and 5-chloro-2,4-dimethoxy aniline (1,8). These compounds are called DEB and ITR amine, respectively, by Pfister. Class I and II compounds are those organics identified by EPA as being most likely to be associated with the formation of dioxins (1).

Pfister produced approximately 30,000 pounds of DEB a year during the 1970's and 10,000 to 15,000 pounds of ITR amine per year from 1961 to 1983 (8).

These compounds were then sold to other chemical companies.

2.2 Storage and Handling Methods

Process wastewater from the DEB and ITR amine manufacturing areas was discharged to the neutralization lagoon from the early 1950's until around 1980. DWR estimates that 5,000 to 10,000 cubic yards of chemical sludge accumulated in the neutralization lagoon during the 30 years it was in use (5). DWR is concerned that if dioxins were formed as a byproduct of manufacturing at this plant, it is possible that this sludge is contaminated (6).

2.3 Past Sampling Efforts

There were no records in the NJDEP or EPA files reviewed which indicated previous soil, sediment, groundwater, or surface water sampling at the Pfister site specifically for dioxin analysis.

3.0 SITE RECONNAISSANCE AND RATIONALE FOR SAMPLING LOCATIONS

3.1 Summary of Site Reconnaissance

On March 19, 1985, E.C. Jordan Co. personnel (C. Moore and W. Britton) and NJDEP representatives (A. DeCicco and R. Tuccillo) met with the Technical Director (A. Gusmano) and the General Production Manager (R. Braun), at the Pfister plant in Ridgefield, NJ. The meeting consisted of two parts: (a) an interview during which site use history and production practices were discussed; and (b) a tour of the facility under the direction of Mr. Gusmano. Using the information gathered during the file review in conjunction with the

observations made during the site visit, three sample areas have been identified at this site. These areas, shown on Figure 2, are:

- o the area adjacent to the cooling water lagoon,
- o the two segments of the lagoon used for process water,
- o the cleared area at the rear of the property (adjacent to the rear lagoon).

3.2 Rationale for Sampling Locations

The active (production) area at this site is paved. The only exposed soil areas observed during the site reconnaissance are the front lawn, the areas around the cooling water and process water lagoons, and the cleared area identified above. Surface runoff, according to the company officials, goes to the public sewer system. However, based on site topography, it appears that some runoff would flow to the soil areas surrounding the lagoons as well as in the cleared area at the back of the site. Therefore, the surface areas between the plant and the lagoons should be sampled. Similarly, even though Pfister personnel indicated that the rear portion of the site had never been used, portions of this area were devoid of vegetation. Also, an old ramp or loading dock is adjacent to this part of the site. Thus, sampling within the rear unpaved area appears to be warranted.

The process water lagoon, which has segments at the side and rear of the property, was the receptor for process water until about 1980. The side lagoon segment (adjacent to the cooling water lagoon) contained a significant amount of water at the time of the site visit, and there was a noticeable oil slick or sheen on the surface of this part of the lagoon. The rear lagoon segment had only small areas of water and these appeared to be low points where rainwater

had collected. Both segments are prime sampling points and sediment samples are proposed.

Based on discussions with the NJDEP staff, it was agreed that 10 samples (not counting duplicates or field blanks) would be collected at this site. A site sampling plan, which identifies the sample locations, is included as Appendix A of this report. Appendix B contains the site specific health and safety plan.

4.0 SAMPLE COLLECTION AND ANALYSIS

4.1 Summary of Sampling Episode

On May 9, 1985, E.C. Jordan Co. personnel (C. Moore and R. Burger) collected seven surface soil samples (including one duplicate) and four sediment samples at the Pfister Chemical site for analysis of 2,3,7,8-TCDD. Two representatives of the NJDEP (R. Tuccillo and W. Mennel) were present during the sampling. The sampling locations are shown in Figure 3. Samples were split at the request of the site owners. Appendix C contains a copy of the field data sheets. Slides of the sample sites are included in Appendix D.

The samples were collected in accordance with the sampling plan (Appendix A) with the following exceptions. Sample 17-1 was moved from the north to the south end of the storage tank because of observed drainage patterns from the process area. Sample 17-6 was relocated because the area adjacent to the rear segment of the lagoon had been filled and graded since the site reconnaissance. Sample 17-6 was taken in an area of undisturbed soil adjacent to an open shed (roof only) which appeared to be used for loading, unloading, and possibly storage of materials. The sediment corer was used for Sample 17-9 only. The sludge characteristics were such that field decontamination of the sediment

corer was impractical. Samples 17-10, 17-11, and 17-12 were collected on the edge of the lagoon with tulip bulb planters.

Ambient air recordings of 8 to 10 ppm were recorded with the PI meter at sample location 2. Levels of up to 350 ppm were measured in the sediments taken from the former process wastewater lagoon.

4.2 Summary of Results

The method employed by ETC for the analysis of soil and sediment samples for 2,3,7,8-TCDD was the EPA September 1983 statement of work, "Dioxin Analysis, Soil/Sediment Matrix Multi-Concentration using Selected Ion Monitoring (SIM) GC/MS Analysis with Jar Extraction Procedure." According to ETC, the accuracy of the analysis is directly dependent on the accuracy of the native TCDD stock solution. ETC uses the certified standard from EPA as the primary standard to calculate the values in the sample. Cal-Analytical uses a comparable method for 2,3,7,8-TCDD analysis known as the EPA Invitation for Bid, Contract Laboratory Program, WA84-A002.

The results of the 2,3,7,8-TCDD analysis by ETC and Cal-Analytical for Pfister Chemical are shown in Table 1 and Figure 3. Data validation was performed by the NJDEP. Repeat analysis was required on four samples which did not initially pass ETC's internal quality assurance review. The repeat analysis was successful on all but one of these samples, Sample 17-11. The NJDEP sent this sample to Cal-Analytical for re-analysis where acceptable analytical results were obtained. In the final analysis, no 2,3,7,8-TCDD was detected in any of the surface soil or sediment samples analyzed and all of the detection limits were below the action level of 1 ppb currently utilized by the NJDEP.

TABLE 1
RESULTS OF 2,3,7,8-TCDD ANALYSIS
PFISTER CHEMICAL, INC.

Sample Collection Date: May 9, 1985
Sample Analysis Dates: May 22, 24, 25, 1985; June 16, 1985
Laboratory: Environmental Testing and Certification
Corporation, Edison, New Jersey

Sample Number	Figure 3 Reference	2,3,7,8-TCDD (ppb ¹)		Sample Type
		Measured	DL ²	
17-1	1	ND ³	0.08	Surface soil
17-2	2	ND	0.08	Surface soil
17-3	None	ND	0.09	Field/equipment blank
17-4	4	ND ⁴	0.04	Surface soil
17-5	5	ND	0.11	Surface soil
17-6	6	ND	0.21	Surface soil
17-7	7	ND	0.06	Surface soil
17-8	8	ND	0.07	Duplicate of 17-7
17-9	9	ND ⁴	0.12	Sediment
17-10	10	ND ⁴	0.51	Sediment
17-11	11	ND ⁵	0.19	Sediment
17-12	12	ND	0.38	Sediment
17-13	None	5.64	--	Proficiency
17-14	None	ND	0.09	Sampler equipment blank

¹ ppb - Parts per billion, i.e., µg/kg of soil or sediment on an "as is" basis.

² DL - Method detection limit which is the concentration at which there is a 99 percent confidence level that the compound is present. ETC only reports detection limits for non-detect results.

³ ND - Not detected.

⁴ Repeat analysis.

⁵ Result of re-analysis by California Analytical Laboratories of West Sacramento, CA on October 2, 1985.

A duplicate sample was taken at sample location 7. The soil collected at this location was thoroughly mixed and then poured alternately into two sample bottles which were then sealed and submitted to the laboratory as a check on the consistency of the laboratory analysis. The results of Samples 17-7 and 17-8 were consistent. No 2,3,7,8-TCDD was detected in either sample with detection limits of 0.06 ppb and 0.07 ppb, respectively.

A combined field/equipment blank was also submitted to ETC for analysis. The blank consisted of analyte-free soil supplied by the NJDEP which was poured through a tulip bulb planter into a foil pan and then into an empty sample bottle at the site. The bottle was then sealed and submitted to the laboratory as a check on possible contamination from the sample site, sampling equipment, or sample containers. No 2,3,7,8-TCDD was detected in the field/equipment blank (Sample 17-3).

A proficiency sample supplied by the NJDEP was submitted to ETC with samples from this site. This sample serves as a check on analytical accuracy and may be comprised of one of three general types:

1. blank clay - nothing has been added to the sample;
2. spiked blank clay - dioxin isomers other than 2,3,7,8-TCDD have been added;
3. spiked soil - various levels of 2,3,7,8-TCDD have been added to the sample with a maximum spike of 10 ppb.

Sample 17-13 was a spiked soil with an acceptable accuracy range of 6.39 ± 0.84 ppb. The measured concentration of 5.64 ppb of 2,3,7,8-TCDD was within the accuracy limits defined by EPA.

An additional equipment blank was submitted to the laboratory with samples from this site. The blank consisted of analyte-free water which was used to

rinse a precleaned tulip bulb planter. The rinsate was collected in a sample bottle which was sealed and submitted to the laboratory for analysis as a check on equipment cleaning procedures. The analyte was not detected in the sampler equipment blank (Sample 17-14).

4.3 Assessment of the Need for Further Dioxin Sampling

The dioxin isomer, 2,3,7,8-TCDD was not detected in any of the samples collected at the Pfister site. These samples included surface soil from six locations and sediment from four locations in the former process wastewater lagoon. However, samples 17-10, 17-11, and 17-12 were collected from the edge of the lagoon instead of from within it, as originally proposed, due to problems encountered with field cleaning of the sediment corer. Future investigations at the Pfister site should include sampling and analysis for 2,3,7,8-TCDD of the sludge material in the central portion of the lagoon.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

RCRA 10907
NEW YORK REGION
GENERATOR INSPECTION CHECKLIST

Generator's Name: PFISTER CHEMICAL INC.

EPA I.D. #: NJD 001293216

Generator's Address: LINDEN AVE. RIDGEFIELD, NJ.

Contact: ARTHUR GUSMANO
TECHNICAL DIRECTOR

- | | <u>YES</u> | <u>NO</u> |
|---|------------|-----------|
| 1. Does generator have an EPA I.D. number? | (X) | () |
| 2. Does generator store material on-site? | (X) | () |
| 3. Is waste accumulated for more than <u>90</u> days? | (X) | () |
| 4. Does generator manifest waste? | (X) | () |
| 5. Does manifest show following information: | | |
| a. Name, address, I.D. of generator | (X) | () |
| b. Name, address, I.D. of transporter | (X) | () |
| c. Name, address, I.D. of designated facility | (X) | () |
| d. Name, of alternative facility | (X) | () |
| e. DOT waste description | (X) | () |
| f. Quantity of waste-volume, weight, number of containers | (X) | () |
| g. Signed certification statement | (X) | () |
| 6. Does generator maintain manifest records? | (X) | () |

7. General Comments:

- 1) WASTE MATERIALS SHIPPED SINCE 11/19/80 ARE LISTED AS "NON-HAZARDOUS" UNDER DOT HAZARD CLASS - UN # 2 EPA WASTE TYPE NOT LISTED IN MANIFEST
- 2) SOME SPILLS THROUGHOUT PLANT GROUNDS, ALTHOUGH MOST OF AREA IS COVERED. ALL STORM DRAINAGE REPORTEDLY GOES TO LAGOON THROUGH STORM DRAINAGE SYSTEM.

Inspected By: James Brady

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

RCRA TSD FACILITY INSPECTION CHECKLIST

Company's Name: PESTER CHEMICAL INC.EPA I.D. #: 03 D 001293216Company's Address: LINDEN AVE, RIDGEFIELD, NJContact: ARTHUR GULMANN
TECHNICAL DIRECTOR
YES NO

1. Does the facility have an EPA I.D. number? (X) ()
2. In what capacity does the facility handle hazardous waste? Circle all appropriate (X) ()

StorerTreaterDisposer

Pile

Drums

Surface Tanks

Subsurface Tanks

Surface Impoundments

Other

Filtration

Incineration

Thermal

Chemical

Biological

Other

Landfill

Land Treatment

Incineration

Surface Impoundment

Other SANITARY SEWER

3. Does the facility generate hazardous waste? (X) ()
4. Does the facility transport hazardous waste? () (X)
5. Does the facility comply with the following (X) ()

- a. Adequate Security (X) ()

Comments: PERIMETER FENCE AROUND GROUNDS WITH GUARD AT GATE.NEUTRALIZATION TANK HAS WARNING LABEL.

- b. Contingency Plan and Emergency Procedures (X) ()

Comments: CERTAIN COMPANY PERSONNEL HAVE BEEN TRAINED. PLANHAS ALSO BEEN SENT TO LOCAL OFFICIALS (FIRE DEPT.,POLICE) HAS

- c. Inspection Plan (X) ()

Comments: DAILY INSPECTION OF DRUMS AND NEUTRALIZATIONLAGOON BY MAINTENANCE FOREMAN.

- d. Personnel Training (X) ()

Comments: SUPERVISORY PERSONNEL IN CERTAIN AREAS (MAINTENANCE,PRODUCTION, ETC) ARE GIVEN TRAINING IN HANDLING

e. Waste Analysis Plan

(X) ()

Comments: COMPANY MANIFESTED LAST WASTE SHIPMENT AS FOR-
GENERIC WASTE. USES PAST SAMPLE ANALYSIS FOR PRESENT
SHIPMENTS. NO ANALYSIS OF INDIVIDUAL DRUMS OR SHIPMENTS

f. Preparedness and Prevention Plans

(X) ()

Comments: WITH COMPANY AND LOCAL GOVERNMENT

6. Has the facility filed a part A permit application? (X) ()

7. Does the facility maintain manifest records? (X) ()

8. Does the facility have other environmental permits? (X) ()

a. NPDES () (X)

b. Air (12) (X) ()

c. State (X) ()
--identify AIR POLLUTION

d. Other () (X)
--identify

9. Identify hazardous wastes handled and method for handling

COMPANY ENGAGED IN TR (4 CHLORO 2 METHYL BENZAMINE) DISTILLATION.
HAZARDOUS
WASTE MATERIAL CONSISTS OF STILL BOTTOMS FROM THE DISTILLATION PROCESS,
MADE INTO A SOLID SOLIDS WITH THE ADDITION OF VERMICULITE. WASTE IS CLASSIFIED
AS F001, CONSISTING OF AROMATIC AMINES AND MONOCHLOROBENZENE. WASTES ARE
CONTINUED ON ATTACHED SHEET

10. General Comments

RECYCLED COOLING WATER IS DISCHARGED INTO A LAGOON. A SECOND, LARGER
LAGOON IS USED FOR PROCESS WASTE WATER AND LOW PH PROCESS WATER.
AT PRESENT THE COMPANY CLAIMS THE LIQUID IN THIS LAGOON MAINTAINS
CONTINUED ON ATTACHED SHEET

Inspected by: Shomes Brady

Date: JAN 9, 1981

PFISTER CHEMICAL INC. (NSD 001293216)

9) (CONTINUED) PACKAGED IN 55 GALLON DRUMS AND STORED UNTIL A SUFFICIENT QUANTITY IS PRESENT TO MAKE SHIPMENT ECONOMICAL - ABOUT 80 DRUMS EVERY FEW MONTHS.

ALL PROCESS WASTEWATERS ARE DISCHARGED TO AN UNLINED LAGOON WHERE SODIUM HYDROXIDE IS ADDED FOR PH ADJUSTMENT. THE DISCHARGE FROM THIS LAGOON IS THEN AGAIN ADJUSTED FOR PH WITH THE ADDITION OF AMMONIA, AND DISCHARGED INTO THE SANITARY SEWER SYSTEM. FLOW THROUGH THIS LAGOON IS ESTIMATED AT 0.50 MGD.

10) (CONTINUED) A PH OF 2 OR MORE. HOWEVER, FLOWS TO THIS LAGOON WILL BE INCREASING IN THE FUTURE, AND THE ALKALINE FEED MAY NOT BE ABLE TO KEEP THE PH ABOVE 2. A PERMIT FOR THIS LAGOON HAS THEREFORE BEEN APPLIED FOR. ~~THIS LA~~

THIS LAGOON IS UNLINED, WITH NO MONITORING WALLS, BUT COMPANY REPRESENTATIVES CLAIM THAT A 30 FOOT THICK LAYER OF CLAY LIES UNDER IT, AND THAT THEY HAVE INSTALLED A 2 FOOT THICK CLAY BARRIER ON THE SIDE OF THE LAGOON AWAY FROM THE PLANT.